



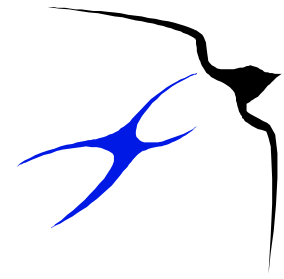
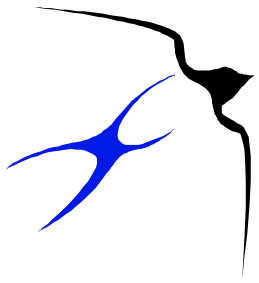
**Cultural Importance of Freshwater
Mussels to Native American Tribes:
a field study of caged mussels**

**Mussels Toxicity Testing
Workshop**

August 23 – 24, 2005

**Tribal Environmental Management Services
Meredith Garvin, Director**

The 10 Tribes of the Tar Creek Superfund Site



- Eight tribes join together in 2000 to conduct a freshwater mussel recognizance in Spring River in northeastern Oklahoma for NRDA purposes.
- Environmental Departments of each tribe and University of Tulsa Tribal Environmental Management Services design plan.
- Tribal elders were interviewed to determine historical gathering and use.
- Tribal Jurisdictional waters were surveyed for live mussels and shells.







Peoria Tribe of Indians of Oklahoma







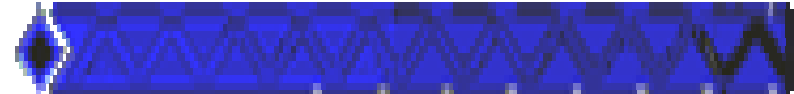


Wyandotte Nation of Oklahoma



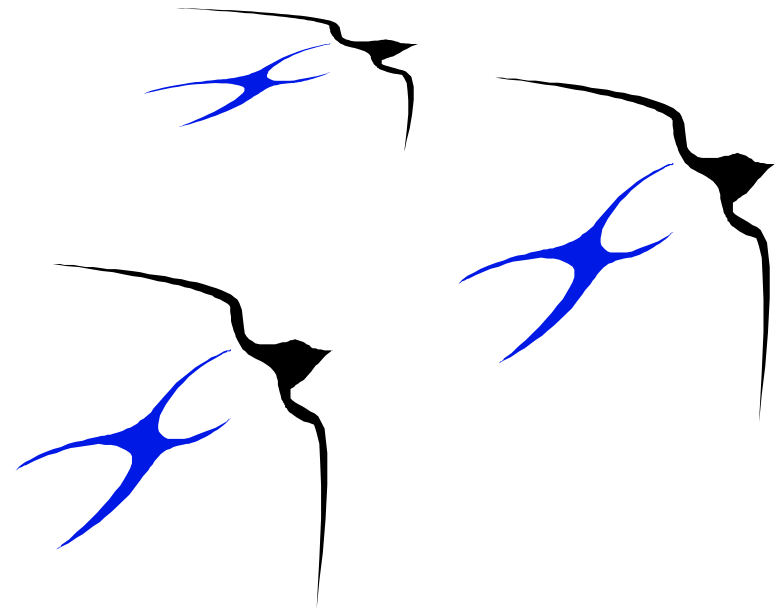


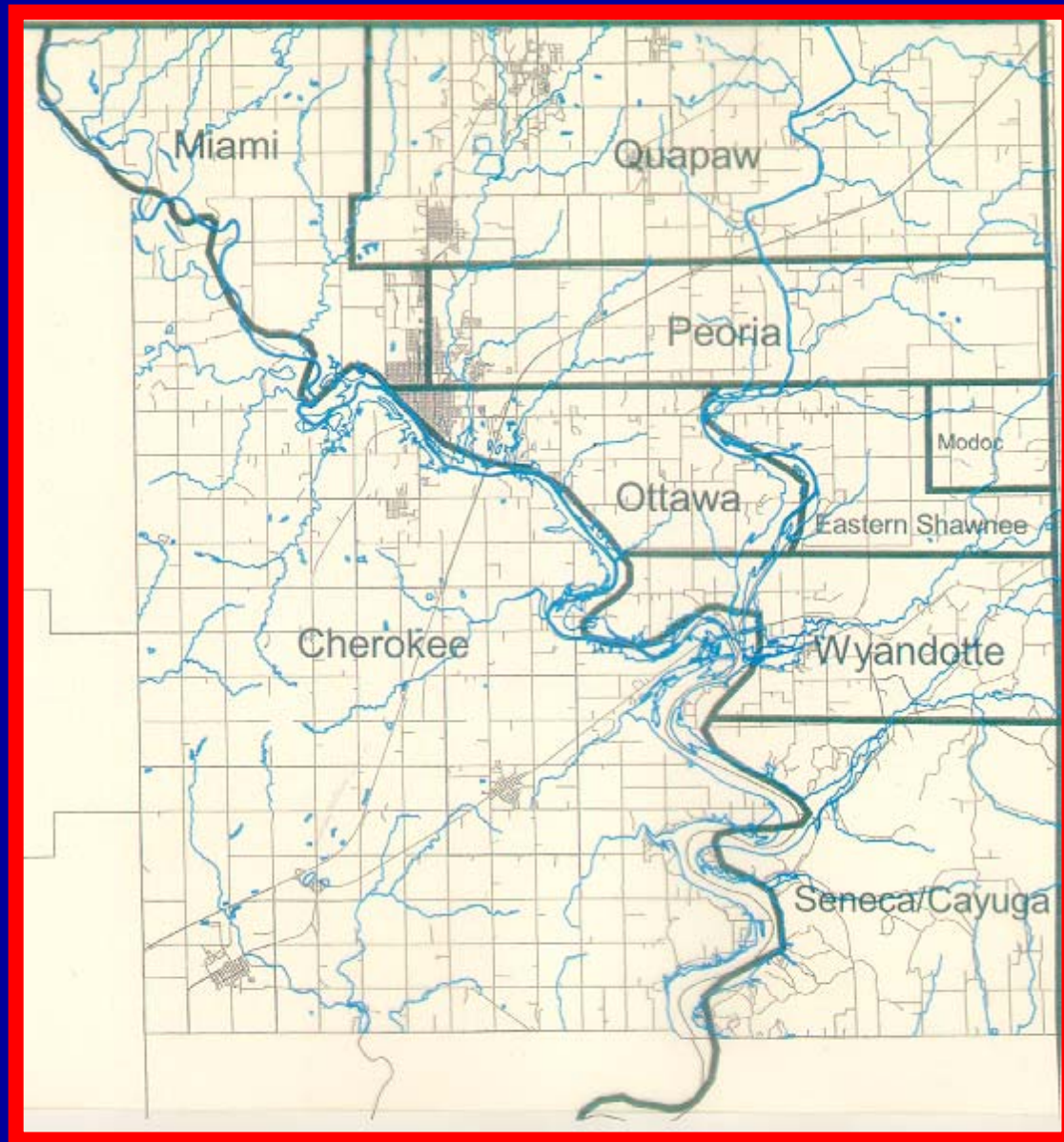
Modoc Tribe of Oklahoma



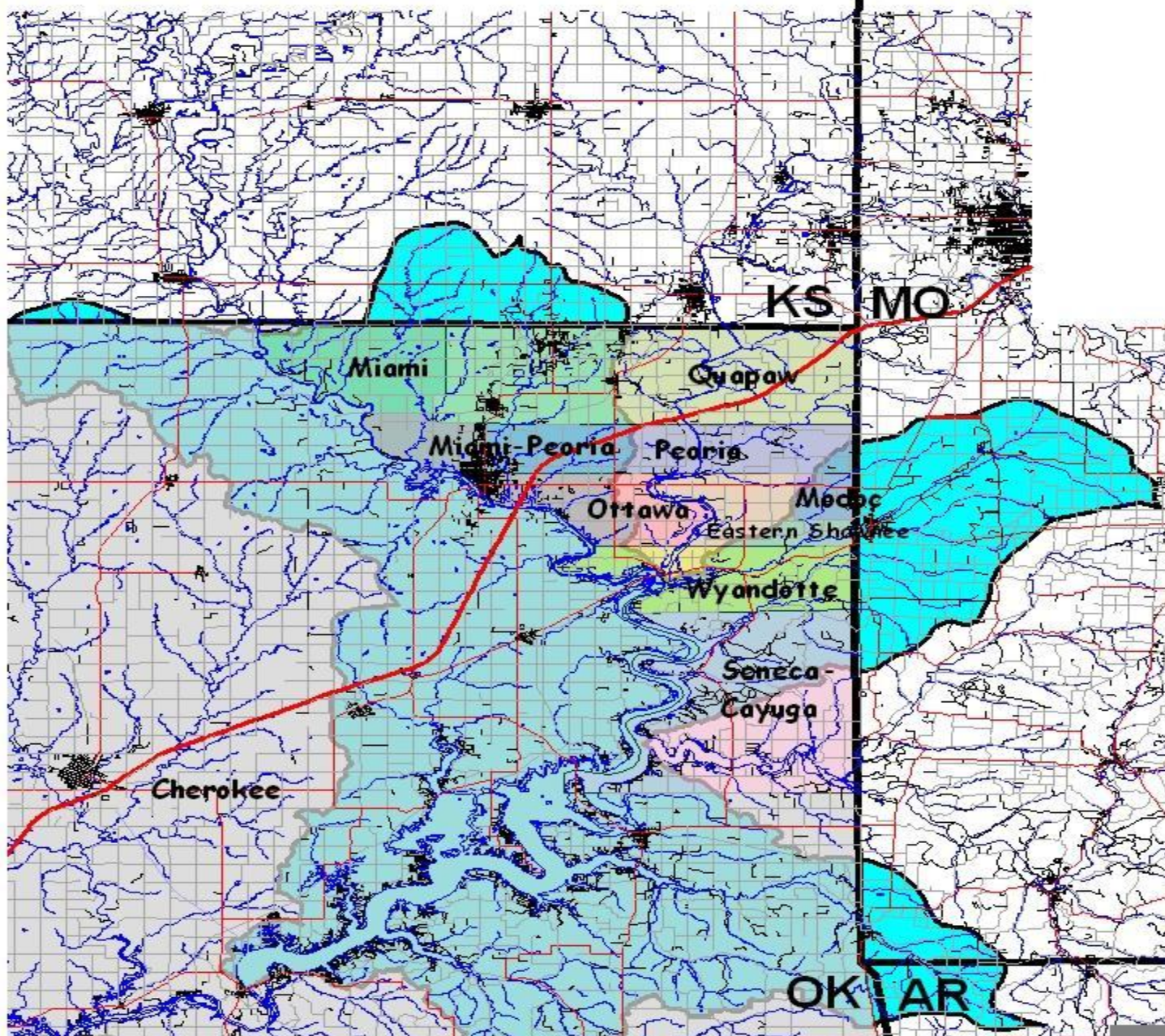
•**Seneca-Cayuga Tribe of OK**

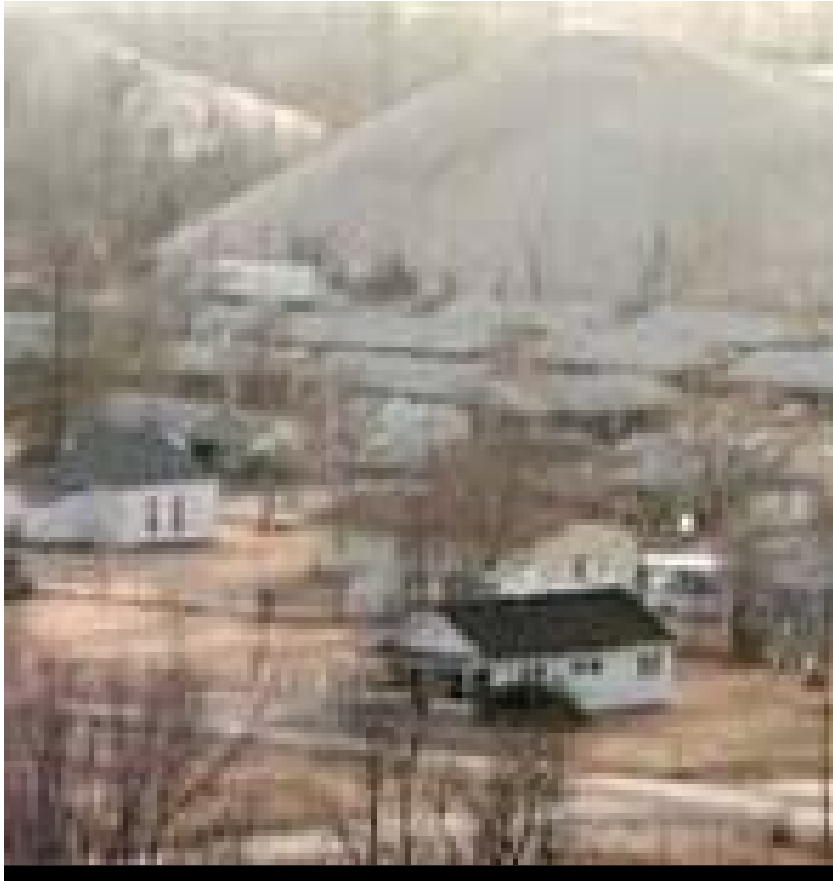
•**Shawnee Tribe**





Indian Lands and HUC 11070206 Lake O' the Cherokees Watershed

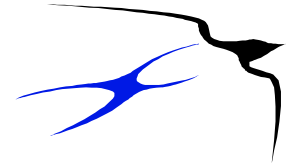




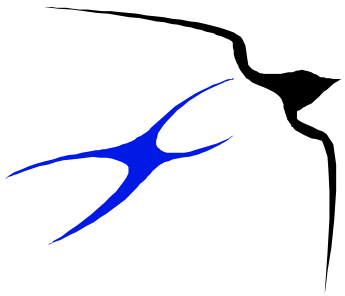
Tar Creek Superfund Site



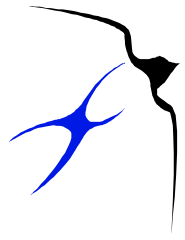
Tribal Concerns



- Chat



“Forty million tons of chat are sitting on restricted Indian owned property” Charles Head, BIA



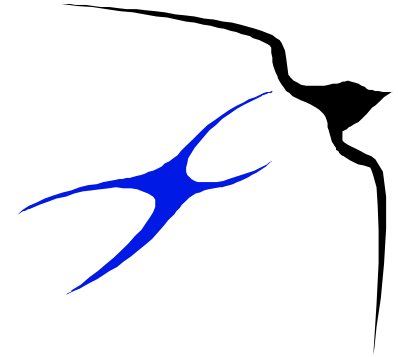
Study Area

- **Surface Water**



Ten tribes live downstream of 1,600 sq miles of Superfund watershed in the Tri-State Mining District. That includes 600 stream miles all the way to Lake Hudson in Oklahoma.

Tribal Concerns

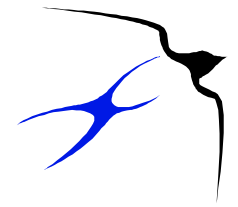


- **Sediments**

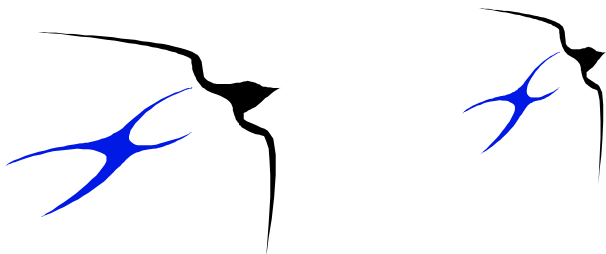
Research conducted by USGS in cooperation With Quapaw Tribe and additional research in cooperation with Seneca/Cayuga Tribe has shown heavy metals in sediments in the upper reaches of Grand Lake.

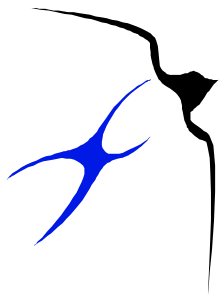
A recent FERC study has shown sediment contamination as far south as Lake Hudson in OK.
Contributors: GRDA, USFWS, OWRB

Tribal Culture

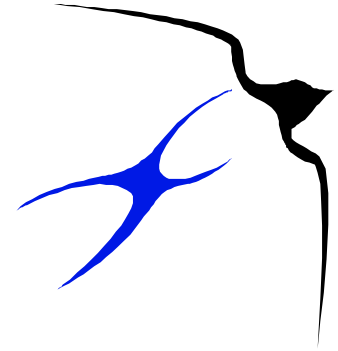


- Archeological evidence dating back 10,000 years tells us mussels were an important subsistence source for food, utensils, ornaments and crafts.
- Villages were located along rivers, not by the presence of big game, but by the abundance of mussels in the water.
- Mussel shells are still seen today in ornaments and jewelry of tribes.





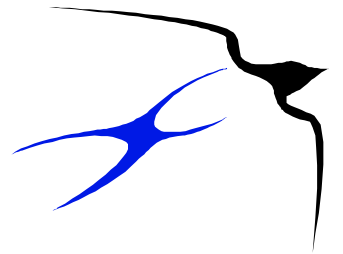
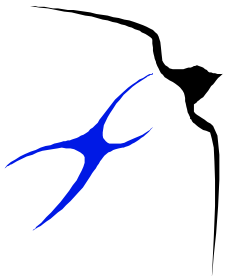
Historic Survey



- **19 Species of freshwater mussels were found in Spring River from Kansas State Line to Grand Lake, documented by relic shells.**
- **Large shell midden located along Neosho River below Miami, OK**
- **Tribal elders remember eating and using freshwater mussels.**

Caged Mussel Study

- Placed 5 cages of mussels along Spring River from State Line to Grand Lake
 - Each cage contained 10 mussels (White heelsplitter – *Lasmigona complanata* from an uncontaminated source which acted as control
 - Each mussel measured/weighed when placed in cage
 - Stainless steel cage used with 1 inch mesh. Bottom of cage ½ in mesh.
 - 12 foot steel fence post used to secure cage to river bottom.





Mussel Study

- At three month intervals, mussels were taken and sent for heavy metal analysis at a certified lab.
- Only mussel flesh was analyzed for heavy metals.
- While mussels are rare in Spring River, its tributaries contain a variety of mussels.

Control Population

- Control population of caged White heelsplitters was maintained and sampled during same sampling event at three month intervals.
- All caged control mussels lived during the study.
- Control population from area outside of Spring River watershed. Abundance of mussels present in waters.




Caged Mussels

- We were able to get samples from the caged mussels over a 9 month period.
- At the end of the 9 months in Spring River, all the remaining mussels were dead.
- 50 mussels were placed in cages in SR
- 30 were taken for analysis over 9 months
- 20 died



Study continues



- The tribes are waiting for the results of this study.
 - Additional tribes have joined in this effort and hope to expand this study.
 - The tribes are planning to work in cooperation with other agencies and researchers.
- 
- 
- 
- 